Risk Factors for Conversion to Total Hip Arthroplasty After Posterior Wall Acetabular Fracture

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Purpose: There is a growing interest in performing acute total hip arthroplasty (THA) for acetabular fractures in cases in which open reduction and internal fixation (ORIF) is suspected to fail. The purpose of this study was to identify risk factors for early conversion to THA in an effort to aid in counseling patients and selecting the optimal treatment.

Methods: The institutional trauma database was searched for patients with acetabular fractures involving the posterior wall from 2005 to 2010 managed with ORIF. Preoperative CT scans, intraoperative imaging, postoperative CT scans, and the operative reports of patients were reviewed. Participants were contacted by telephone to document reoperations and functional outcomes including the Short Form (SF)-8 and modified Merle d'Aubigne Hip Scale.

Results: There were 65 patients with both pre- and postoperative CT scans who were contacted at a mean of 6.9 years (range, 4-9.3) after surgery. There were 29 (44.6%) isolated posterior wall, 25 (38.5%) transverse posterior wall, 6 (9.2%) posterior-column posterior wall, and 5 (7.7%) T-type with an associated posterior wall fracture. The overall rate of conversion to THA was 16.9% (11/65). Presence of dislocation, comminution of the posterior wall, femoral head impaction, acetabular impaction, and intra-articular loose bodies all trended toward an association with conversion to THA. Presence of all five radiographic features was associated with a 50% (5/10) rate of conversion to THA in contrast to 10.9% (6/55) if four or less features were present (P = 0.009). Age, gender, time to closed reduction, and presence of an associated acetabular fracture were not significantly associated with conversion to THA. Among cases with less than 1 mm of diastasis and step-off on postoperative CT scan there were no THA conversions (0/8) compared to 9.1% (4/40) for 1 to 4 mm and 53.9% (7/13) if either step-off or diastasis was 4 mm or more (P = 0.001). The presence of all five radiographic features of severe injury was associated with a reduction step-off or diastasis greater than 4 mm in 60% of cases (6/10) compared to 12.7% (7/55) of less severe injuries (P = 0.005). There was no difference in SF-8 (16.4 vs 17.4, P = 0.63) or modified Merle d'Aubigne scores (8.0 vs 8.9, P = 0.39) comparing patients who underwent THA and those who did not.

Conclusion: Posterior wall acetabular fractures associated with the combination of dislocation, comminution, intra-articular loose bodies, femoral head impaction, and acetabular impaction are associated with more difficult reduction and higher rate of conversion to THA in comparison to less severe injuries. Patients should be counseled accordingly about the need for future arthroplasty and consideration can be given to primary THA in these severe cases. When ORIF is undertaken, anatomic restoration of the acetabulum to within 1 mm of both step-off and diastasis, which cannot be accurately detected with plain radiographs, is associated with the lowest risk of posttraumatic arthritis.